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HAPPINESS FIRST
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THE RELATIONSHIP OF CEPHALO-PELVIC DISPROPORTIONATE DYSTOCIA TO INTELLECTUAL DEVELOPMENT OF THE CHILD

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INTRODUCTION

During recent years, the view that a large proportion of cases of mental retardation is attributable to organic damage has become more widely accepted. This change of view has stemmed both from improved diagnostic techniques and from experimentation with animals.

It has been recognized that secondary amentia or mental retardation of early organic etiology may stem from causes before, during, or after birth. This paper is concerned with the effects of the birth process itself. Specifically, the purpose of this article is twofold, to review recent literature on the role of birth trauma in causation of mental defect, and to report a follow-up study of children known to have had difficult birth due to cephalo-pelvic disproportion.

Two general methods have been utilized in the attempt to relate mental retardation, or other long term effects, to difficult birth. One method involves starting with known groups of mentally retarded children. Then, birth records are examined; and a tabulation is made and tested to determine if the number of retarded children of these difficult births exceed that of the general population of births. In the second method, one begins with hospital records of difficult births and children are examined at a later date to determine if the frequency of mental retardation is greater than among children in the general population. The first approach suffers from the necessity of combining information from many sources, much of which will be inadequate or unreliable. As a consequence findings obtained by different investigators have varied greatly.

The second method, that of commencing with documented birth records, has been selected for this study. With this procedure one may begin with records from one hospital which are of more uniform adequacy and reliability, locate cases, and apply uniform criteria of intellectual functioning.

In attempting to relate conditions of the birth process to later development, there remains the problem of selecting the appropriate variable for study. One can begin with conditions external to the infant, e. g., cephalo-pelvic proportion, length of labor, duration of anesthesia or mode of delivery; *or* with the symptoms manifest in the infant itself, e. g., apnea, poor muscle tone, excessive molding, and with other distortions of the head. Most previous investigations have been concerned with the effect of isolated conditions, especially apnea, or duration of labor. In this study it was decided to commence with an underlying condition of difficult birth, rather than with a specific symptom. This condition was cephalo-pelvic disproportion and in this investigation its relationship to later intellectual functioning is studied.

REVIEW OF THE LITERATURE

Birth Conditions of Mentally Retarded Groups: As previously stated, there are two general approaches to the problem of relating birth conditions to later physical and psychological status: (a) the follow-up study of documented cases of difficult birth, and (b) retracing known cases of mental retardation to their birth records.

In both cases the emphasis has been chiefly on the effects of apnea, although some (e. g. Benaron *et al*, 1953), have considered factors such as the effect of prolonged labor with forceps delivery.

Doll, Phelps and Melcher (1932) reported on twelve cases of low imbecile to dull normal intelligence selected on the basis of neurological diagnosis of cerebral lesion, present symptoms, family, birth, and developmental histories. Six of these manifested apnea sufficient to warrant resuscitation after delivery. Nine were reported to have had difficult birth. Deficient animation was reported for nine cases. It should be noted, however, that these cases were not representative of the institutional population, but were selected in part on their birth record as well as symptomatology. This study suggests the possibility of difficult birth resulting in motor and intellectual handicap but gives no indication of the likelihood of defect among difficult births in general.

Schreiber (1939) reported on a group of 252 mentally retarded children with spastic or convulsive symptoms that were thought to be related conditions at birth, and for whom reliable birth data were obtainable. Children for whom an inherited deficit was suspected, or who had a history of postnatal cerebral trauma or infection were excluded from the group. Most of these children were observed in private prac-

tice or at the Children's Hospital at the University of Michigan. Of these, 176 or 70 per cent were found to have a history of asphyxia which appeared to be unrelated to manner of delivery, parity, or to whether it was a single or multiple birth.

Penrose (1949) disagrees with Doll and Schreiber in a review of 1280 institutionalized defectives examined in England between 1930 and 1937. He found only 11 whose physical conditions combined with their histories warranted a diagnosis of birth injury as the main cause of their mentally defective status. He estimated that the proportion of fairly certain cases due to birth injury was less than one per cent.

Review of available literature failed to reveal other systematic studies of birth records of mentally retarded children. Many others have reported their impressions from extensive experience and clinical practice. For example, Cornell (1926), in discussing organic nervous diseases of school children, claims that infantile cerebral paralysis results generally from injury during a difficult labor, particularly if obstetrical forceps are required. There has been, however, a paucity of systematic investigation based on this method. What work has been done, as reported above, appears to suffer principally from inadequate sampling. The relation between non-hereditary mental defect without motor involvement and difficult birth remains to be more fully explored.

Follow-up Studies of Difficult Birth: In those investigations based upon the second method, that of following up cases of difficult birth, we find results that are markedly divergent. The work of Darke (1944) and Preston (1945) suggests that asphyxia at birth has some serious effect upon the intellectual development of the child. On the other hand, McPhail and Hall (1941), Hunt and Foust (1949), Keith and Norval (1950), and Benaron *et al* (1953) failed to find significant sequelae to this or to other symptoms of difficult birth.

Darke (1944) completed a study of 46 cases of severe asphyxia neonatorum at the New York and University of Pennsylvania Hospitals. All had had three minutes of asphyxia pallida or had been apneic for three minutes with no neurological signs. They were examined at ages from 2.4 to 11.7 years with the Stanford-Binet test. Their IQ's were significantly lower than those of sibs and/or parents who acted as control subjects.

Preston (1945) reported on 132 children from her practice who had had prenatal, natal, or post-natal anoxia. Of these 35 were of subnormal intelligence and manifested a variety of symptoms. She claims

that the damage to the central nervous system of every child was serious enough to affect subsequent behavior. Those children with lesser degree of anoxia seemed to be hyperactive, while those with a greater degree tended to be apathetic or to be epileptic. Of the 97 children with normal intelligence, 49 per cent were rejected by their parents because of their behavior. Unfortunately, in this study the selection of cases was not clearly outlined nor correlational analysis presented.

McPhail and Hall (1941) followed up 870 randomly selected deliveries and located 270 of this group. Of these 270 deliveries, 159 had been made without analgesia and 111 with; 23 cases were accompanied by mild apnea, and 11 by severe apnea. All children located were given the Kuhlman-Anderson intelligence test and their daily behaviors were rated on the Haggerty-Olson-Hickman scale. There was no difference in mean IQ either between the analgesic cases, nor between apneic and non-apneic cases. There were no cases of mental retardation in the apneic group.

Hunt and Foust (1949) found 86 cases of extremely difficult deliveries among 12,500. Of these 86, eight were stillbirths and four died neonatally. 43 of these were re-examined at ages from six weeks to 26 years. Other than one convulsive case and one death due to an irrelevant cause, no medical or psychological abnormalities were found.

Keith and Norval (1950) completed a follow-up study of 111 cases which suffered from asphyxia at birth. Of these, 86 were located and examined, and only four were found with abnormalities including mongolism, strabismus and two convulsive disorders. These may be compared to the 88 control cases, among which four abnormalities were also found — one strabismus, two fibrile convulsives and one petit mal disorder.

An intensive analysis of 40 cases each of prolonged labor with forceps delivery, of precipitate labor, and of normal spontaneous delivery was made by Benaron *et al* (1953) at the Chicago Maternity Center. These children represented cases which were located at five to 12 years of age. Pediatric and neurological examinations were made and, in addition, each subject was given the Stanford-Binet intelligence test, Porteus Mazes, laterality tests, speed of tapping, and a visual motor test involving completion of geometric figures. No significant differences among the three groups were found on the neurological and pediatric examinations. Also, there was no difference in the *mean* intelligence quotient on the Stanford-Binet or in performance on the

Porteus Mazes among the three groups. However, there was a significantly greater *number* of feeble-minded in the precipitate group.

Certain other differences were noted in the precipitate group. They showed a greater dispersion in mental age on the Stanford-Binet than did children of the other two groups. Also, when subjects of the precipitate and normal or spontaneous delivery group were matched for mental age, it was found that the former were inferior in their ability to reproduce such figures as a circle or a triangle. There was some indication that the precipitate group did not have a clearly defined laterality in the use of the eyes, hands and feet as did the others. Whether higher frequency of mental retardation and the other characteristics cited may be attributed to birth conditions is open to question. Although it was stated that the groups were drawn from a uniformly low socio-economic stratum, the relationship of mental deficiency to socio-economic status in the precipitate group was more explicitely given. Also there was a marked difference in parity among the three groups. Whereas there were only 4.5% primiparous births in the precipitate group, there were 67% in the natural and 83% in the prolonged forceps group. Age of the mother at the birth of child was also correspondingly high in the precipitate group. Relevant to the study described in this article is the fact that prolonged labor and difficult birth bear no apparent relationship to later intellectual functioning of the child but age of mother and parity may do so.

Relation of Difficult Birth to Intellectual Status: Confounding Factors: In attempting to establish or test the existence of a relationship between difficult birth and later intellectual development, several factors must be considered and controlled. Perhaps Baird (1952) presents the most comprehensive picture of the complex interrelations involved. He discusses the effect of age, parity, and social background on the incidence and type of difficult labor. In the higher income, and concomitantly more highly educated families, there is more dysfunction associated with maternal age, and there are fewer spontaneous deliveries. There are smaller, planned families, with more first births, (and more difficult labors), but few complications of high parity. Contrariwise, women in this group tend to be taller, of better physique and consequently have fewer contracted pelves and should have less difficulty from mechanical causes. Women from higher socio-economic strata, although they know more about the birth process, have a greater fear of difficult labor, and consequently have fewer spontaneous deliv-

eries, more operative interference for slight causes, and more often cease childbearing because of previous difficult labors.

On the other hand, Baird states women of the lower socio-economic bracket begin bearing children earlier, have more spontaneous deliveries, larger unplanned families, fewer first births, but more serious complications of high parity. They are of shorter stature, poorer physique and have more contracted pelves. Yet, they have less fear of difficult labor, and consequently more spontaneous deliveries, less operative interference, and difficult labor has less effect on size of family. While Baird's study does not deny the possible effect of difficult birth, it does point to the complexity of variables to be considered.

In the study of difficult birth, there are several interrelations that should be taken into account. Gruenwald (1952) discusses the interrelation of mechanical birth trauma, neonatal anoxia and shock. As he points out, shock can be the result of anoxia and of mechanical trauma; also anoxia can be the result of shock. Shock can cause adrenal hemorrhage which can also be mistaken for the results of trauma. On the other hand, mechanical birth trauma, particularly to the brain, can, and does, cause anoxia. Another important point, which this author maintains, is that anoxia predisposes some organs to mechanical trauma; this may very well be true of the central nervous system. Relevant to the present research, the danger is seen of defining difficult birth in terms of symptomatology of the newborn infant; asphyxia may not only be the result of some prenatal condition but may cause conditions similar to those generally associated with mechanical trauma. On the other hand there are workers, e. g., Zuelzer (1948), who deemphasize the relation of anoxia at birth with the development of later neurological lesions and consequent retardation. This author believes that the fetus and neonate have a physiology peculiar to their time of life which protects them from variation in oxygen supply incident to labor and delivery. Some experimentation with anoxia in animals supports this view.

Discussed above are but a few of the factors that should be controlled, or at least evaluated, in any study of the relation of difficult birth to later intellectual development.

PRESENT INVESTIGATION

SAMPLE AND PROCEDURE: The purpose of this study was to determine the relation of cephalo-pelvic disproportionate dystocia to later intellectual development of the child. Use of two matched groups was anticipated, these being selected from children born at the University of

Pennsylvania Hospital during the period of July 1942 to March 1949. Experimental (dystocic) and control (eutocic) groups were to be matched for race, age, and sex of subject, age and parity of mother, socio-economic level of family, and hospital ward status. The dystocic group was selected according to the following criteria:

(a) case history of birth with diagnosis of cephalo-pelvic disproportion (inlet or outlet type) or contracted pelvis.

(b) cephalic presentation of a mature infant weighing 2500 grams or more.

(c) case history after meeting criteria *a* and *b*, evaluated by a consulting obstetrician who made the final decision after examination of all case history data and who in addition to above criteria selected cases manifesting at least two of these signs of difficult birth - prolonged labor, mid or high forceps delivery, apnea for more than three minutes, poor muscle tone and excessive molding.

Of the 9330 deliveries of full term living infants during the period stated, 492 cases had a history of cephalo-pelvic disproportion and/or contracted pelvis of the mother. From the 492 cases, 52 were selected by the consulting obstetrician as being difficult births according to the criteria noted above. The potential sample was reduced considerably since, in a large percentage of the cases of cephalo-pelvic disproportion, deliveries were made by Caesarian section, either elective or failed trial-of-labor (without complications). Only those cases of Caesarian section with delivery after prolonged labor were included, on the grounds that excessive head pounding with resulting damage may have occurred prior to surgery.

A field worker was employed to locate the families of the 52 children in the potential sample, to obtain their cooperation and to bring the children to the hospital for examination. Of the 52 families, the field worker was able to locate 25 in the Greater Philadelphia area. One child had died within the first month and four children could not make the necessary appointments or otherwise cooperate in the investigation. Thus a final dystocic group of 20 children, 13 boys and 7 girls with a mean age of 8.3 were examined.

Birth conditions of these children are given in Table I. Socio-economic level, age of mother, parity, race, and ward status of participating families are described in Table II.

Table I

Description of birth conditions and infant at birth

Labor (Total, 3 stages)	N	Delivery	N	Anesthesia	N
<12 hours	6	Forceps, med.	6	Type:	
12-24 hours	6	low	2	Inhalation	14
25-48 hours	6	Caesarian		Spinal	6
>48 hours	2	failed-trial-			—
	—	of-labor	10		20
	20	"Spontaneous"	2	Duration:	
			—	60 or more mins.	6
			20	30-59 minutes	7
				<30 minutes	3
				Unspecified	4
					—
					20

Maturity	N	Sex of Infant	N	Cyanosis	N
42 weeks	1	Male	13	Marked	3
41 weeks	2	Female	7	Slight	2
40 weeks	14		—	None or not	
39 weeks	1		20	noted	15
38 weeks	0				—
37 weeks	1				20
36 weeks	1				
	—				
	20				

Duration of Apnea	N	Resuscitation	N	Molding	N
>8 minutes	2	Intratracheal 0^2		Marked	8
7-8 minutes	3	or nasal catheter	4	Slight	8
5-6 minutes	3	Nasal or oral 0^2	5	None	4
3-4 minutes	0	Other methods	1		—
1-2 minutes	2	None	10		20
<1 minute	10		—		
	—		20		
	20				

Caput Distortion	N	Weight of Infant (gms.)	N
Marked	6	>4000	1
Slight	6	3800-3999	2
None	8	3600-3799	3
	—	3400-3599	5
	20	3200-3399	3
		3000-3199	5
		<3000	1
			—
			20

Table II

Socio-economic level, age of mother, parity, race and ward status of participating families

Socio-economic Status		N	Age of mother at birth of child	N	Parity	N
I	Professional	1	18-20	2	1st child	15
II	Semi-Professional, Managerial		21-23	5	2nd child	2
			24-26	3	3rd child	1
III	Clerical, skilled trades, Retail business	3	27-29	4	4th child	1
			30-32	3	6th child	1
IV	Rural owners	0	33-35	1		
V	Semi-skilled, minor clerical, minor business	5	36-38	1		
			39-41	1		
VI	Slightly skilled	8				
VII	Day laborers	2				
		20		20		20

Race: White 6, Negro 14 = 20
Ward Status: Private 5, Ward 15 = 20

All children were given a general physical and neurological examination by a pediatrician who also obtained standard developmental histories from the parents.

During the psychological examination the children were administered the *Wechsler Intelligence Scale for Children*, the *Heath Rail Walking Test* and the *Bender Visual Motor Gestalt Test*. They were also tested, bilaterally, for strength of grip on a dynamometer. The Wechsler Scale was administered and scored according to standard procedures. The procedure utilized for the Rail Walking test was that described by Heath (1942). Raw scores of this test were converted to age equivalents on the basis of Heath's norms for Philadelphia school children (on file at The Training School). Three measures of grip strength were made for each hand and the average score converted to equivalent age levels according to Smedley's norms for public school children.

No follow-up of control subjects was carried out. Analysis of the results from the dystocic group obviated the conclusion that relative impairment, if any, in this group would not be revealed by small sample procedure.

RESULTS AND DISCUSSION: Results of the physical and neurological examination, and of the developmental histories were analyzed and summarized by the examining pediatrician. The general physical health

of all the children in the dystocic group was found to be satisfactory, and, possibly, slightly superior to what might be expected of a random sample of the city's public school population. Two children were reported to be of advanced, and one of retarded, development, but in no case was the pattern of development considered to be deviant. One child was a mild behavior and emotional problem. Five children manifested questionable positive Babinsky responses during the neurological examination but the examiner felt these responses were not of clinical significance. In any case, they did not appear to be related to any specific birth condition or to later intellectual functioning. In all, the physical health and development of the children examined were what one might expect of a randomly selected group of children, and certainly did not reflect any intracranial damage which might have occurred during the birth process.

Results obtained on the Wechsler Scale in terms of means and standard deviations of IQ's and subtest scores are compared with data from Wechsler's normative population in Table III. Means and standard deviations of neither the scale nor subtest scores differ significantly from the normative group. Examination of the socio-economic level of the families of the dystocic group (see Table II) indicate that they are

Table III

Wechsler IQ's and subtest scores for Dystocic group and for Wechsler's standardization population

Wechsler Scale and Subtests	Dystocic Group (N = 20)		Wechsler Group	Normative Age 7½	Wechsler Group	Normative Age 10½
	M	S.D.	M	S.D.	M	S.D.
Full Scale	99.0	14.3	100	15.0	100	15.0
Verbal Scale	98.1	12.3	100	15.0	100	15.0
Performance Scale	109.4	14.2	100	15.0	100	15.0
Information	9.6	3.1	10.0	2.9	9.9	2.9
Comprehension	9.9	2.7	10.0	2.8	10.1	3.1
Arithmetic	10.0	2.5	10.1	2.7	10.2	3.1
Similarities	8.8	3.3	9.9	2.8	10.0	3.0
Vocabulary	9.5	3.2	10.1	2.6	10.1	3.1
Digit Span	10.2	3.7	9.8	2.7	10.0	2.9
Picture Completion	10.2	2.7	10.0	2.8	10.0	3.0
Picture Arrangement	10.7	2.8	10.1	2.9	9.9	3.1
Object Assembly	10.2	3.0	9.9	3.0	10.0	2.9
Block Design	9.2	2.8	10.1	2.8	10.1	3.0
Digit Symbol	9.6	3.3	10.1	3.1	10.0	3.1

fairly representative of the general urban population. If there is any deviation it is toward the lower end of the continuum. The results, then, are no different than one might expect from a similar group of children of normal birth conditions. In examining individual cases it was noted that none of the children from the "higher" socio-economic levels have IQ's under 100; one child of defective intelligence comes from a family with a background of mental deficiency. There seems to be no more or no less dispersion of intelligence relative to socio-economic status than is true in the general population.

Results on the Heath Rail Walking test and on the measures of grip strength are presented in Table IV. These as well do not differ markedly from those expected of a random sample of the general population. An objective analysis of the Bender-Gestalt was not completed as comparison with existing norms would have been of limited value. However, a subjective analysis of the drawings indicated no unusual signs and performances were, generally, appropriate to the mental age of the subject.

Table IV

Chronological ages, and age scores earned by the Dystocic group on the Rail Walking and Dynamometer tests

	M	S.D.
Chronological age	8.3	1.9
Heath Rail Walking	8.8	2.2
Strength of grip	8.2	2.3

In view of these findings, a control group was not utilized. As a cross check, however, the relation of intelligence to several variables of birth, parity and status of mother was studied within the dystocic group itself. The sample was subdivided on the basis of these variables, and the subgroups compared as to intellectual level. In Table V are presented the results of this analysis.

In all cases the numbers involved are insufficient to warrant statistical analysis, but are presented as possible leads for further exploration. In this examination of the relationship between the variables above and later intellectual development, we find no suggestion of a significant relation except between age, parity, hospital ward status, and race of mother and the intelligence of the child. On the other hand, the older and high parity mothers are drawn from both higher and lower

Table V

The relation within the Dystocic group of Intelligence to birth conditions and condition of the newborn infant

Variable	Subgroup	N	Range IQ	Mean
Age of mother at birth of child	Age mother >30	6	65-101	89
	Age mother <30	14	75-123	106
Parity	Primiparous	15	75-123	107
	Multiparous	5	65- 97	88
Race	White	6	84-123	110
	Negro	14	65-110	95
Hospital ward status	Private	5	96-123	109
	Ward	15	65-116	96
Length of labor	>30 hours	6	65-120	99
	<30 hours	14	75-123	100
Type of delivery	Caesarian	10	65-123	100
	Non-Caesarian	10	75-120	100
Duration of anesthesia	>60 minutes	8	75-110	95
	<60 minutes	12	65-123	103
Cyanosis of infant	Present	5	75-123	102
	Absent	15	65-123	99
Duration of apnea	>3 minutes	8	84-123	101
	<3 minutes	12	65-120	98
Molding	Present	7	91-116	100
	Absent	13	65-125	98
Weight of infant	>3400 grms.	10	65-123	92
	<3400 grms.	10	91-116	106

socio-economic groups. Examination of all other available information about these mothers failed to reveal a basis for the relation of intelligence of the children. Although the numbers are small, the data suggest a relation between intelligence of the child and age and parity of the mother which warrants further investigation. The incidental findings of Benaron *et al* (1953) are relevant here. They noted a higher frequency of mental retardation in children of precipitate deliveries, than in children of normal spontaneous deliveries. However, mothers in the former group tended to be older and of higher parity. Beck (1935) and Bender (1952) pointed out the dangers in precipitate birth, insufficient warning to permit usual preparations with a rapid passage through the pelvis resulting in intracranial injury, and the sudden decrease of pressure upon the skull which may tear the subdural blood spaces and lead to slowly progressive venous hemorrhages. However, there may be factors associated with maternal age and parity which also may be related to the intellectual development of the child. The relation of maternal age, for example, to incidence of mongolism has been well established (Oster, 1953 and others) and this has been accounted for, variously, in terms of depleted reproductive power, maternal endocrine dysfunction, or age-determined physiological dysfunction. In the pres-

ent study the suggested relationship between maternal age and parity, and the child's intellectual development, in conjunction with the results of Benaron *et al* (1953), indicate further investigation of precipitate birth with age and parity of mother adequately controlled.

SUMMARY AND EVALUATION: This investigation as a whole revealed no relationship between difficult birth due to disproportion and later intellectual development of the child. We can conceive of difficult birth in a group of children manifesting its effect upon later development in two possible ways. They may result in fairly high frequency of damage resulting in a minor intellectual deficit, say, a drop of a few IQ points. This could be revealed by control and experimental groups of the size originally envisioned in this study. No such effect was apparent in our sample. The second possible manifestation would be in somewhat higher proportion (than in the general population) of *major* intellectual deficit, e. g., mental retardation. If this is true, then small sampling techniques may fail to reveal such differences in frequency.

None the less, despite the limitations of our study it is significant that in 20 cases representing the most difficult births from nearly 500 cases of cephalo-pelvic disproportion, there was no appreciable loss in intellectual function nor a high frequency of mental retardation. These results are congruent with those of Benaron *et al* (1953) who found no significant effect of prolonged labor with forceps delivery upon later intelligence of the child. Most of these cases of difficult birth were associated presumably with disproportion.

With present day prenatal diagnosis and obstetric care, particularly that available at such teaching hospitals as that from which our sample was obtained, only the less serious cases of disproportion are allowed to be delivered naturally or to continue for prolonged periods in labor previous to Caesarian section.

It is concluded that cephalo-pelvic disproportion, at least where modern obstetric care is available, does not contribute to the frequency of mental retardation in the children involved nor does it have appreciable effect upon the intellectual development of the child.

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BOOK REVIEW

Valentine, C. W.
PARENTS AND CHILDREN

New York: Philosophical Library, 1955. xi, 212 p. $3.75

This volume, as Professor Valentine specifies, is intended for those parents who are interested in a better understanding of their children. and in improving their methods of training. In style and content, it is essentially a textbook of developmental psychology, and as such may be too formal in presentation to appeal to the large proportion of parents. The absence, a deliberate one, of a theoretical system may make the book more palatable, but leaves the reader to consider, in isolation, most of the specific problems of child development and training.

In Part I, the need of the parent for some sort of psychological orientation is stressed; common sense and maternal instinct, so-called, are not enough in themselves. He warns the parent against the liberal interpretation of advice given by specialists in other fields who are not necessarily psychologically trained.

Two sections are devoted to a discussion of motivation and influences of experience on basic urges. Unfortunately, this part of the book has not been too well organized; classification and bases of needs, wants, emotions and motives seem rather loose and vague. His discussion of problem issues, however, is handled in a manner likely to be accepted by most professionals of eclectic orientation. Part IV, on general intelligence and special abilities, covers quite comprehensively and well such issues as individual differences, differences within the family, stability of intelligence and the development of special abilities with maturation.

Development of the child from infancy to adolescence is treated in the fifth, and major, section. Organization is, generally, in terms of the more serious problem areas at each developmental stage, although norms for the first two years are fairly adequately described. Many constructive suggestions for training are offered. These are usually given with qualification sufficient to stimulate thoughtful consideration and do not demand the blind acceptance seemingly expected by many guides for parents. The section is punctuated with much anecdotal material about the author's own children. Although forewarned, many parents will be disappointed in the accomplishment of their offspring, if they use as yardsticks these children of more than average endowment.

Two chapters of Part VI are devoted to special school problems and discipline in the home. It is here that the author's avoidance of a theoretical or systematic point of view is most evident. He takes a middle-of-the-road, and possibly sane, course which will please neither the overly rigid and moralistic, or the overly indulgent parent. Many psychologists will be annoyed at the author's apparent condoning of corporal punishment as a last resort in cases of anti-social behavior. However, the need for discovering (and treating) the causes of such misbehavior is appropriately stressed.

Despite its formal approach Professor Valentine's book is quite readable and is recommended for the thoughtful parent.

—Alfred Butler, Ph.D.

A PROGRAM OF MOTOR THERAPY FOR YOUNG MENTALLY DEFICIENT CHILDREN OF THE NON-FAMILIAL TYPE

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INTRODUCTION

The following educational experiences are a part of the differential program planned by McCartney (5) for those mentally deficient children of non-familial origin with IQ range 50-70, mental ages 3-6 to 5-2, and chronological ages 6-10 years, and showing certain characteristics indicative of developmental needs in the motor area.

I. CHARACTERISTICS OF THESE CHILDREN

All of the children assigned to this group showed a wide scatter of scores on the Primary Mental Abilities Test by Thurstone (9). All but one child scored between 3-0 and 3-5 on the motor part of the PMA. There was no child in the group with a basal score of 4 years on the Oseretsky Tests for Motor Proficiency (6).

The following characteristic syndromes of central nervous system impairment as set down by Doll (1) were noticed: *awkwardness instead of orthopedic handicaps* shown in the gait of the children as they walked down the hall or when they would run in circle games on the playground; *lack of kinetic facility* shown by the children when they would try to open thermos bottles, assemble educational toys or use pegs and peg boards; *muscular embarrassments* shown when the children tried to walk "heel and toe" down a line on the floor; *disturbances in rhythm* shown when the children tried to keep time to music.

The above characteristics seem to be unique handicaps to these children. If areas of the brain have been disturbed so that normal physical movements cannot go through them, then we have to employ other brain areas and learn as skills those activities which other people grow into. These paths of reaction must be established by training and

Ed. Note. In her article in The Training School Bulletin, Vol. 51, No. 2, pp. 27-33, Mrs. McCartney described a broad differential program for the exogenous group of mentally retarded. She presented the program in its various aspects as related to sensory-motor coordination, auditory discrimination, visual discrimination, mental abilities, communicative arts, writing, understanding numbers, motor therapy, and pre-vocational readiness. In the present article she is presenting details of her program on the sub-area of motor therapy.

practice and do not become established unless the individual is so trained. This training should come to these children while they are still growing, developing, and forming habit paths in their neuromuscular systems.

Doll (1) believes that these major motor indications of awkwardness and clumsiness indicate a minor degree of balance and coordination and that these manifestations appear to respond favorably to corrective physical education.

Strauss and Lehtinen (8) state that class games designed to motivate and interest the normal or familial type mentally retarded child are overstimulating for the brain-injured child, with the result that the child who is hyperactive and disinhibited is driven to boisterous talking, shouts, and uncontrolled laughter.

II. EDUCATIONAL EXPERIENCES BASED UPON OSERETSKY'S SCALE OF MOTOR PROFICIENCY

The following experiences are a few of the lessons planned as directed therapy to help these children control and coordinate their movements so that they may acquire better manual ability, skill, and equilibrium.

a. General Dynamic Coordination

A ladder was placed on the floor and the children learned to jump over the rungs in various ways, jumping with both feet at a time, jumping on the left and right foot separately, and jumping on alternate feet. The class also did the same type of exercise on a ladder outlined on a piece of canvas.

Various walking exercises were planned. Another piece of canvas 12′ x 15″ with footprints outlined and colored red for the right foot and blue for the left foot was placed on the floor. The child started by placing both feet in position and walking "heel and toe" position down the line and ending with both feet in place as shown on the canvas.

A similar strip of canvas was used to mark a guide for the child to hop down the line. A colored object designated the beginning point and a broken line showed where to hop and another colored object designated where to end. Hopping was done by both feet, one foot at a time, and alternate feet.

Two chairs or large objects were placed about three feet apart and the children learned to hop on one foot around the objects in a figure eight fashion. The use of the left as well as the right foot was developed.

A small wooden frame about 15″ x 18″ was placed on the floor and

the children learned to jump up and down on their toes with feet together ten times as the teacher counted and then the child would jump out. This was called playing Jack in the Box.

A weighted matchbox was placed on the floor and the children learned to push it along a line on the floor with one foot while holding up the other foot like hopping.

b. Dynamic Coordination of Hands

The children were taught how to roll, bounce, and toss a ball to descriptive music, Wadley and Allison (12). Three sizes of balls were used starting with the large beach size ball and gradually getting down to the use of a tennis ball.

The children learned to take little plastic people through a maze drawn on a large piece of paper placed on the floor. This helped the children to visualize the principle of moving through a maze. From this the children learned how to trace through a maze with a pencil on a large chart. This was followed by the children doing pencil mazes at their desks. This whole activity followed the scope and sequence of developing better spatial thinking as given by Thurstone (10).

Cutting was structured in the pre-vocational readiness area (5).

Screwing was developed by using first the large wooden screw designed by Playskool. The children learned how to take apart all of the screws and bolts. This was followed by giving the children the Playskool bag of bolts which are smaller in size. Finally the children were given a set of regulation bolts and screws to take apart and put together. It was noticed that this activity helped to develop the ability to grasp with the thumb and forefinger.

c. Simultaneous Voluntary Movements

It seemed very difficult for these children to perform different actions with each hand at the same time. Later on, in jobs open to these children it will be necessary for them to use both hands with dexterity. Much of the inability to perform with dexterity by these children, on objective tests or on actual jobs, may be due to lack of adequate training rather than lack of potential. To develop this ability, attempts were made to train each hand of the child in specific actions. Again, exercises to be performed by each hand were planned.

The children learned to put a dot in each square of railroad tracks outlined on a large blackboard using one track for the right hand and the other track for the left hand. This is very similar to one of the test items on the Harris Test for Lateral Dominance (2).

A game of bean bag toss was learned. Each child stood on a designated place and tossed two bean bags, one with each hand onto designated places on the floor.

The ability to join two parallel lines with perpendicular lines and the ability to join two rows of dots in parallel formation were also developed. The dots and lines were outlined on a large blackboard. The exercises were followed by similar work at desks. The ability to use both hands independently in this exercise was also developed.

Through these activities the children seemed to be able to engage in the Oseretsky tests for simultaneous voluntary movements with more success. It was not felt that these exercises interfered with left or right-handedness, but instead it seemed that children with uncertain dominance established preference more readily.

III. RHYTHM ACTIVITIES

The book, *Discovering Music* (12) was used to base and structure the instruction of beginning rhythm with these children. The lessons are designed to teach the ability to keep time by clapping and to sense the rests and holds in music by not clapping.

A tape recording of the instructional material was made. The class listened carefully while the recording was played through once. The recording was played through a second time and the teacher did as the voice and music suggested. On the third playing the teacher and children would do as directed. Through much repetition the children learned to clap in time and to hold his hand or rest as the music indicated.

When a child showed the ability to clap to music he was given rhythm sticks to play. In this way all of the children gradually learned to use the sticks. Some of the children would be using sticks and some would be clapping. It was found that the children using rhythm sticks helped the slower children who were clapping emphasize the beat through strong auditory stimulation.

As soon as the children learned to use rhythm sticks, a variety of rhythm instruments were introduced, such as triangle, bells, wood block, tambourine, clogs and drum. These were all played by the same technique of tapping or clapping. Each child felt secure in playing any instrument.

With several of each kind of instrument, a rhythm band was composed. Orchestrations were made by having certain instruments play for certain phrases of familiar rote songs. The children would sing as they played their instruments.

A "marching band" was devised. Here the children would march as they played their instruments to marching music. Marching seemed easier for these children after they had this basic instruction in rhythm work.

These activities seemed to strengthen auditory-motor coordinations. There was also a direct channeling of motor responses. The excessive clapping and boisterous responding to music with rhythm instruments did not take place as it often does with these children when the instruments are given out and the children are given freedom to express themselves.

IV. HARMONY PIPES

The Harmony Pipes (3) were introduced to the group after the ability to sing simple rote songs and the ability to clap to rhythm was developed.

The songs and music for the Harmony Pipes are very simple and the melodies have a pronounced but easy rhythm. The songs were taught as rote songs first. This was followed by the class clapping to the melody and then they were taught how to play the melody on the pipes.

The process of how to play the pipes was structured in the following steps:

Develop the ability to hold the pipes correctly

Develop the ability to imitate the teacher when she blows certain pipes

Develop the ability to blow the pipe when the teacher's hand is moved down

Develop the ability to blow the pipe as long as the teacher's hand is closed

Develop the ability to change the blowing of pipes one to another as the teacher does

The class played both the alto and tenor pipes by imitation rather than following the two part arrangement given in the regular guide. Two-part harmony and the reading of the notes may be done by older developmental children.

The ability to play Harmony Pipes develops the child's ability to coordinate visual and auditory responses with the motor function of blowing.

V. SING AND DO IT EXERCISES

It is important that these children acquire a strong, natural and refined habit of moving which may be carried over into daily life.

Work was planned which would give as simply as possible to every child an understanding of these basic daily movements so that they might develop their muscles and bring them to their natural strength and refinement.

The book, *Sing and Do It* (4) contains action songs which are presented in three general classifications of movements, pushing-pulling (traction and repulsion); swing (counter balance); and spring (rebound). The work is all graded according to the growth and development of such movements.

The exercises are all very simple and definite without much play-like procedure. Each phrase of the exercise contains the direction for the response. Thus the child gives himself the command and he must then follow his command which makes for better concentration and coordination. The songs are about simple things in every day living and are presented with accompanying gestures which indicate the meanings of the words. Some of these children learn their first words through hearing, singing, and acting these little songs over and over again.

The process of "sing and do it" was structured in the following steps:

Teacher sings and acts out the exercise as the class watches her
Teacher says each phrase as each child acts out the phrase
Each child says the phrase as the teacher acts it out
Each child says and does the exercise himself
Each child says and does the exercise as the music is played

Many children may have to say the phrases rather than sing them. Children who are very severely handicapped by language engage in the exercises and the various sounds they may make are accepted.

When speech and action are coordinated, we see better control of motor functions on the part of the child. This basic technique of coordinating speech and action is followed quite closely in all areas of learning for these children. This ability also seems to lead to a disciplined freedom for these children.

VI. DRAMATIC DANCES

It appears that these children do not remember complicated evolutions of a process and they do not seem to be interested for any length of time in dancing figures unless there is a story connecting them. The teacher selected simple dramatic dances based upon familiar Mother Goose rhymes. When these mentally deficient children heard these

rhymes told by the teacher, they showed a feeling of security through the auditory perception of the rhyme or story, even if they could not say or repeat the selection. There was nothing new for the child to learn when he attempted to sing or say the rhyme and he seemed to be among friends when he attempted to dramatize the characters. Mary Shafter's (7) book, *Dramatic Dances for Small Children*, gives a good selection of such dances.

These pantomime dances are taught after the ability to coordinate speech and action has been developed. The process of learning a pantomime dance is structured in the following way:

Develop ability to follow directions on command
- shake your finger
- clap your hands
- nod your head
- bow
- turn around

Develop ability to coordinate a certain action with a certain phrase

Develop ability to sing the phrase and do the coordinated action

The association of certain musical phrases seemed to help the child carry out the directions. This activity correlates action with music.

VII. SHADOW WORK

The performance behind an illuminated screen provides an opportunity to teach the application of the learned abilities mentioned above.

A large wooden frame 5′ x 6′ made of 1″ x 1½″ lumber and covered with sheeting was made. Two smaller sections were hinged at each side so that the shadow frame could stand as a three panel screen in front of a large electric light bulb. When the room was darkened, the children would go behind this screen and perform individually or with a partner any of the above activities.

When these children perform behind the screen, they seem to lose any fear or timidity which they may show before people when asked to do certain things on command or suggestion.

This activity also helps these children engage in simple performances for the entertainment of others which is item 49 on the Vineland Social Maturity Scale under socialization (11).

CONCLUSIONS

The teacher has used this program of motor therapy with several different groups of similarly classified children. The following evaluations were made of a group of 13 children presently engaged in the program.

At the beginning of instruction 5 of the 13 children could not jump on both feet or on one foot. 4 of these 5 children were receiving medication, 2 for seizures, 2 for hyperactivity and motor disinhibition. At the end of 5 months' instruction, all of these 5 children could jump.

All of the group of 13 children showed refinement in control and coordination of movement. This was shown by the apparent improvement in their ability to trace, to follow the dot pictures, to write numbers 1-10, to print and write their first and last names, and to copy simple words. 7 of the 13 children have developed these abilities to the extent that they can copy simple words correctly and legibly.

All of the 13 children have increased their basal score on the Oseretsky Tests. They also showed increases of 8 months to 18 months on the motor scores of the PMA test.

It was observed that the older children (chronologically) did not always show the greatest growths either in test scores or the refinement in control and coordination of movements. It was felt that all of these various growths and improvements were not due primarily to natural maturation but due to directed teaching therapy.

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Presentation of gifts to The Training School highlights "Vineland Day" program. Seated: Mrs. Wilson Y. Christian, Dr. Harold A. Delp. Standing, left to right: Mrs. John Kerrigan, Mrs. C. Howard Sanborn, Dr. Walter Jacob, Mrs. Winfred Reinhard.

VINELAND DAY GIFTS TOTAL OVER $4300

Vineland Day at The Training School on May 23, sponsored by the New Jersey State Federation of Women's Clubs, attracted more than 400 clubwomen from all parts of the state, the largest attendance in recent years.

One of the highlights of the program was the presentation of a check for $3678 to the school. Lending The Training School financial assistance for its research projects has been for many years one of the state group's chief interests. Mrs. John Kerrigan of Merchantville, Vineland Day chairman, made the presentation to Dr. Walter Jacob, director of the school, who expressed his deep appreciation to Federation members for their continued support.

An additional gift this year was presented by Mrs. Wilson Y. Christian, of Ocean City, immediate past president of the Federation. As a tribute to her leadership during the past three years, the Second District placed the sum of $628 at her disposal for distribution to the Federation project of her choice. Her choice was The Training School. The amount has been used toward the purchase of a tape recorder for the school's speech clinic and a screen for the auditorium.

Mrs. C. Howard Sanborn of Glen Ridge, who has succeeded Mrs. Christian to the presidency, headed the numerous state officers present.

Among them were Mrs. John M. Alton of Ventnor, the newly elected southern vice president; Mrs. Winfred Reinhard of East Orange, retiring public welfare chairman, and Mrs. Henry S. Leach of Paterson, who now heads that department. The Second District was represented by Mrs. J. Wesley Hambleton of Bridgeton, former vice president, and her successor, Mrs. Allen B. Endicott of Atlantic City. Mrs. Arthur E. Kittredge of Audubon, vice president of the First District, also attended.

Mrs. W. Howard Sharp, chairman of Vineland Day last year, Mrs. James W. Beck, president of the Woman's Club of Vineland, Mrs. Howard R. Ahlquist, president of Vineland's Wallsholm Club, and nine other members of the two clubs served as hostesses.

During the morning hours, the guests were taken on guided tours of the children's cottages and other buildings on the main grounds. Buses loaned by the Vineland Board of Education transported visitors to Menantico Farms for a tour of farm buildings and other points of interest.

Following the luncheon on the lawn, Training School children entertained the guests with a tuneful variety program, "County Fair." Clowns, colorful characters from Mother Goose story book, the crowning of the County Fair Queen, a pet parade of chickens, ducks, dogs and puppies, an ewe and her young lamb, a pony, and, of course, the children's faithful friend Adonis the Donkey — all contributed to the gaiety of the performance. A recitation of "Casey at the Bat" by one of the boys, with the humorous story acted out by three other youngsters, also was greatly enjoyed by the appreciative audience. A band concert on the lawn was directed by Hugh Kelly, the school's bandmaster.

The entire entertainment program was under the direction of the Education Department staff headed by Dr. Harold A. Delp.

A crafts show in "Happiness Hall" displayed dresses, blouses, aprons, and numerous articles of wood, metal, papier mache, all made by the children.

As one of the main speakers for the day, Brit Stusvig of The Training School's Education Department, began discussing the methods of teaching and training exceptional children in her native Norway, a sudden downpour interrupted her speech and the guests repaired to the safety of the Administration building. There, Dr. Mortimer Garrison, Jr., the school's chief psychologist, reviewed briefly the role of research in mental retardation and struck a hopeful note in predicting ultimate progress in research into the causes and prevention of mental deficiency.

Queen Marie, complete with crown and scepter, smiles upon her loyal subjects.

Antics of clowns delight guests during children's performance.

Children's crafts exhibits on display in Happiness Hall are admired by "Vineland Day" guests.

Mother Goose gives last minute coaching to Mary's Little Lamb.

Visitors from Storyland receive applause from appreciative audience.

Young masters line up their pets for "County Fair" parade.

In Memoriam

RAYMOND KEYSER
born January 18, 1893;
enrolled in The Training School June 24, 1903;
died March 28, 1956.

When Raymond passed through the Pearly Gates into his heavenly home, he must have been greeted by The Master, for the sweet smile on his kind face was the same as when he was greeted by his friends on earth.

Raymond was one of our beloved boys who found his greatest happiness in doing kindly acts for his friends, and particularly so for the boys who needed him and depended upon him for assistance with their writing of letters home.

During Raymond's boyhood days he lived at The Training School, attending school regularly, and during that time he gained a very practical academic education. When he had completed what was considered a liberal education for a boy whose real interest was gardening, he was transferred to our Menantico Colony where a boy of his basic ability was needed. He was not needed so much for his actual work as for the morale of the first family of boys who went to live at the Colony. These boys were accustomed to the larger family life at The Training School, and Raymond helped them to adjust to the new conditions of Colony life. From his first day there he was a "big brother" to this family of 12 boys who were the pioneers and helped with the clearing of the land.

Today, when we see Menantico Colony looking like a millionaire's estate with its fertile lands, a lovely lake, fine buildings, and even a modest little chapel nestled in the valley, it is hard to visualize this same tract of land as it looked when the pioneers, Professor Johnstone, Mr. Merithew, and the boys began clearing the land. It was then covered with scrub oak, native knotty pine, wild grape vines, wicked thorns, and briar bushes.

Raymond loved to talk about these days and to tell people how they had changed a wilderness into beautiful fields and gardens. And this was true as very soon Raymond's flower gardens were the pride of the Colony. No one ever loved a garden and raising flowers for his

friends more than he did. At his funeral, beautiful flowers covered his casket and his many friends in attendance said: "How Raymond would rejoice over the flowers and their meaning — the love of his friends."

After a few years, when the Colony was well established and Raymond became a self-appointed secretary to the boys, he decided that if he had a room where he could talk with the boys without being interrupted, he could write better letters. His idea was approved, and in one of the small original buildings "Raymond's Hobby Shop," as it was called, became a real office. A good-sized woodburning stove heated the room, and donations of second-hand furniture furnished it, together with the articles which Raymond made or purchased. It was certainly a cosy room, and if boys walked in from the farm with muddy boots, no one was troubled. Likewise, if a box of cookies, opened and inviting, stood on the table, the boys knew they could help themselves to one or two and Raymond would not mind. In this "Hobby Shop" Raymond wrote many letters for his friends, helped them to select and wrap their Christmas and holiday gifts to be sent home to their parents.

Raymond also developed a real talent which was appreciated by everyone who knew him. That was the converting of old Christmas cards into truly beautiful new ones. His method was to cut from the old cards the lovely pictures of flowers etc., and to remount these on attractive plain cards. In addition to the pictures, he would write appropriate verse and greetings, and many a time the boys would suggest the greetings for their own cards. In his selection of verse and in his quotations Raymond used excellent judgment. Raymond's idea developed from his wish to help the boys with their Christmas gifts. In time, some of his cards became real classics, and many of them have been preserved as keepsakes by the parents and others who were delighted with his Christmas remembrances.

Raymond's handwriting was very plain and readable, but he decided that if he had a second-hand typewriter to use in the completion of his cards, they would look more professional. He was provided with such a typewriter and he taught himself by the "pick and find" method, as he called it, to do a pretty nice job. But after a while, when he realized that many keys on a second-hand machine did not work right and some not at all, he decided to return to his handwriting system. One day a friend suggested that he write a letter to Remington Rand and tell them how much he needed a new typewriter. He followed the advice and was the happy recipient of a fine new gift typewriter. "A visit with

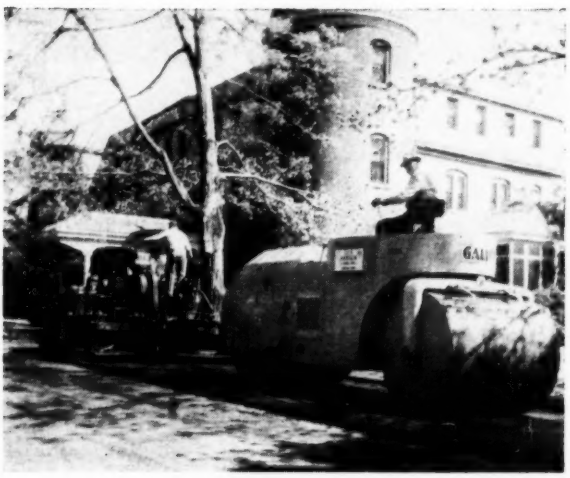
Raymond," which includes the story of the typewriter, was published in the March 1951 issue of The Training School Bulletin. It is an interesting story and well worth reading.

The Chapel, built of Jersey sandstone quarried a short distance from the Colony, is an artistic looking little church with its steeple and bell. It was loved by Raymond and the boys as much as great men love their cathedrals. Raymond was the guardian of the building and gave it wonderful care. For the Harvest Home, Christmas and Easter celebrations he decorated it with the same joy and pride as he decorated his cards. He also helped with all the Sunday programs, and particularly with the special programs presented on these holiday occasions.

This year, without Raymond to inspire and help the boys, the Easter Service reflected his absence, and for many years to come he will be both missed and remembered for the loving service which he rendered to his dear Colony friends who needed and loved their "big brother."

"In the Garden" was one of Raymond's favorite hymns, and today we can think of him as walking among the flowers "In the Garden" where God's love reigns supreme.

—Alice M. Nash



Among recent improvements is new bituminous concrete surface on Training School roads.